

LA-UR-21-32021

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Title: A Solution to Asymmetric Marangoni GTA Weld Behavior in a Dissimilar
Chemistry Stainless Steel Joint

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Intended for: Report

Issued: 2021-12-09

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A Solution to Asymmetric Marangoni GTA Weld Behavior in a Dissimilar Chemistry Stainless Steel Joint.

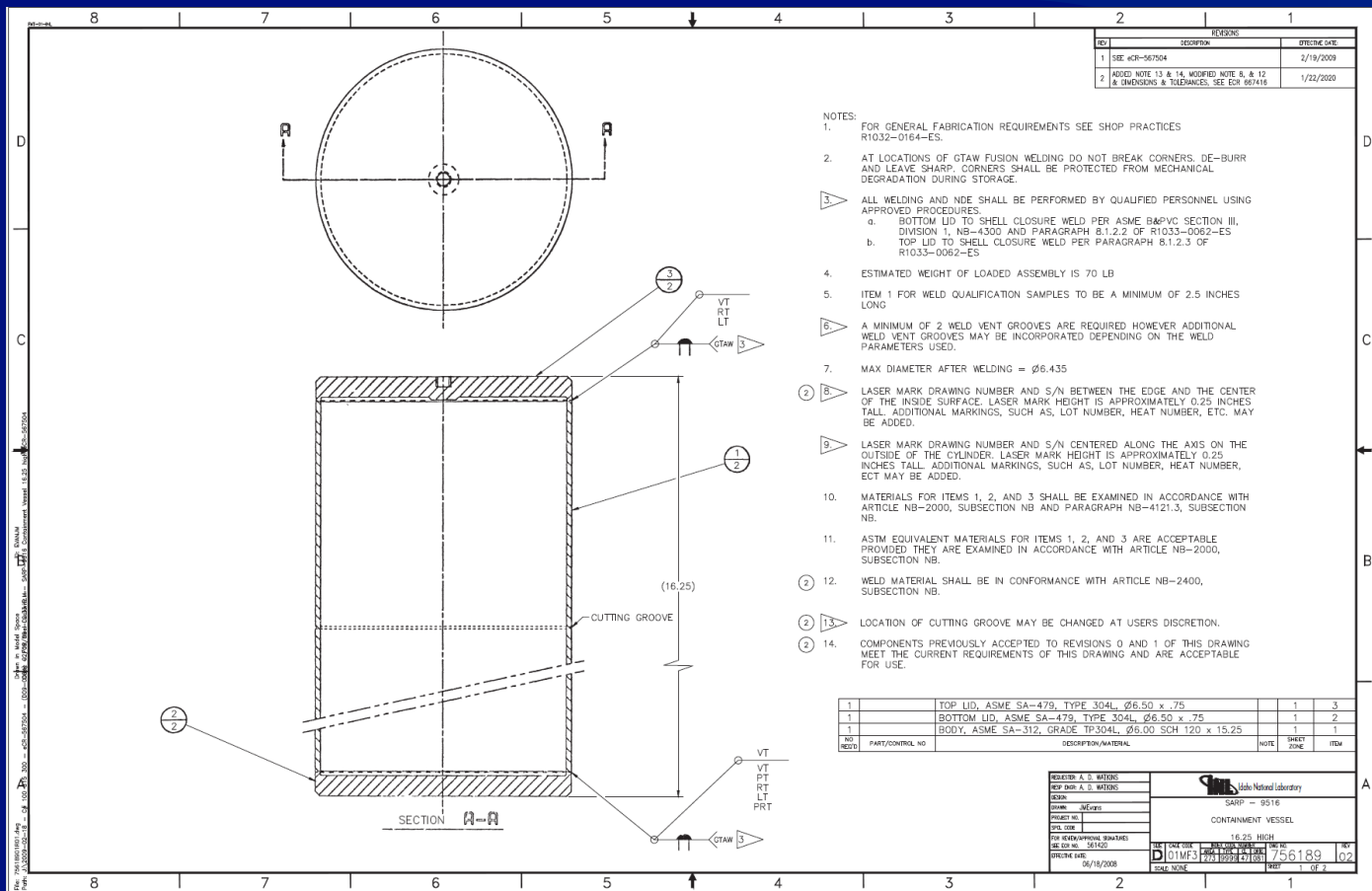
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AMPP-1, Heat Source Technologies

June 7, 2021

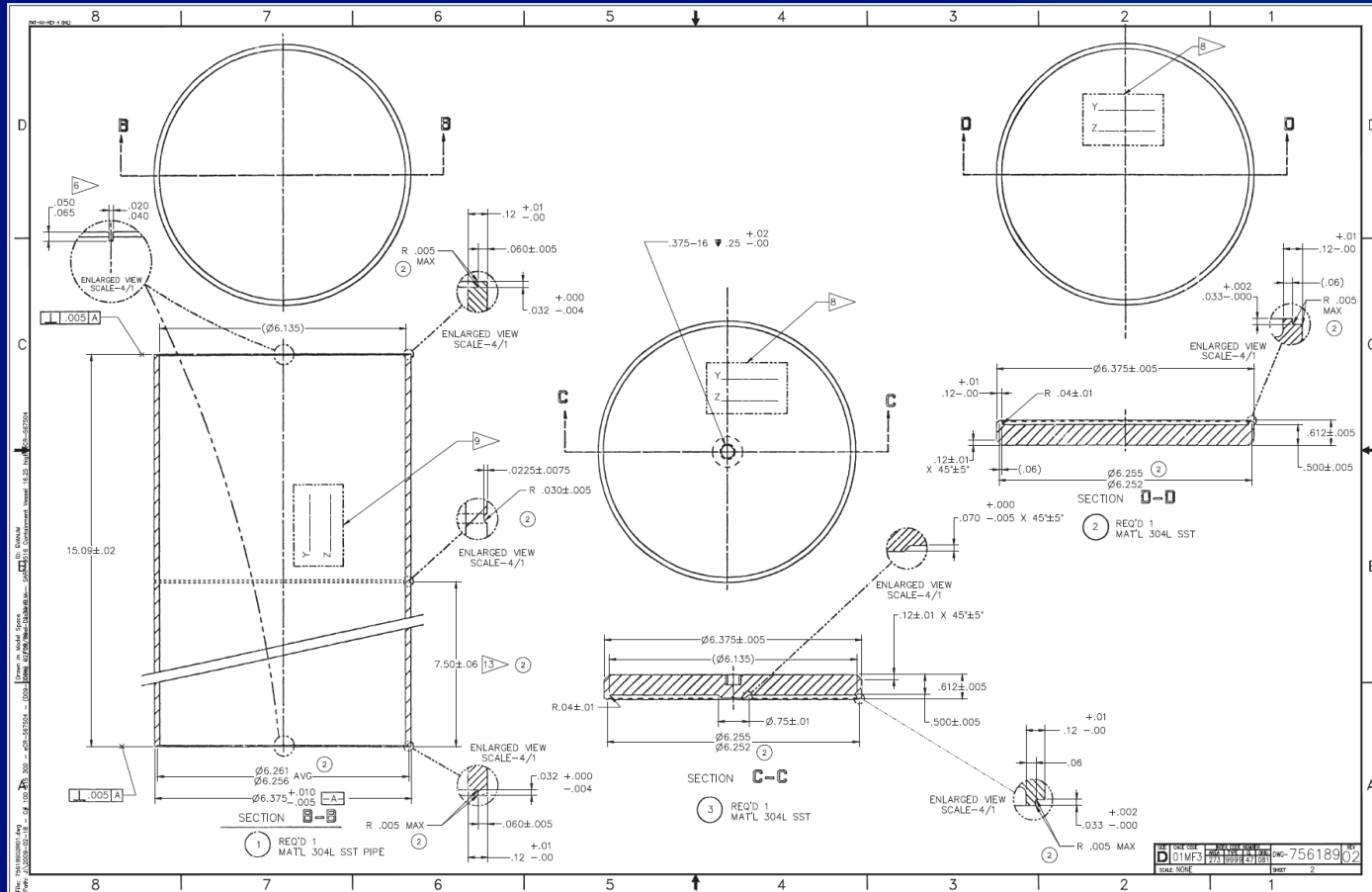
Introduction

- Asymmetric and irregular weld morphology is an issue with the 9516 shipping container GTA weld.
- Observation of the weld puddle and cross sections showed the weld was biased toward the body side of the joint.
- This issue is attributed to a difference in the sulfur content and Marangoni fluid flow characteristics of the lid (150 ppm) and body (10 ppm) components of the weld joint.
- An additional contributing factor in this issue is the large difference in mass between the $\frac{1}{2}$ " thick lid and $\frac{1}{8}$ " thick body
- A solution was developed comprised of a preliminary partial penetration weave pass across the joint intended to homogenize the sulfur content prior to the full penetration pass.

The 9516 Containment Vessel



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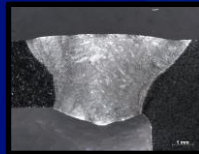
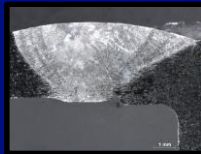


The Problem: Single Pass, Irregular CV Weld

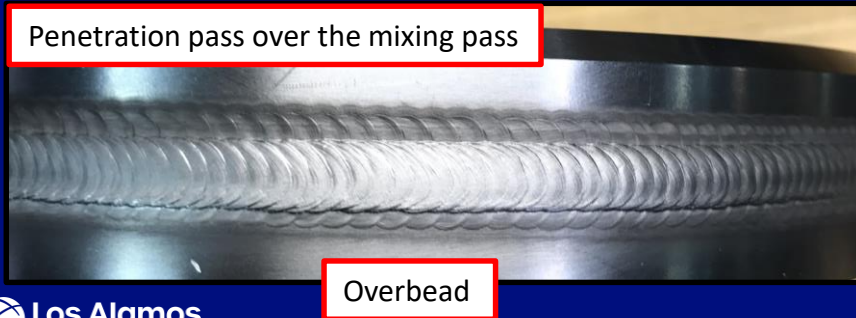
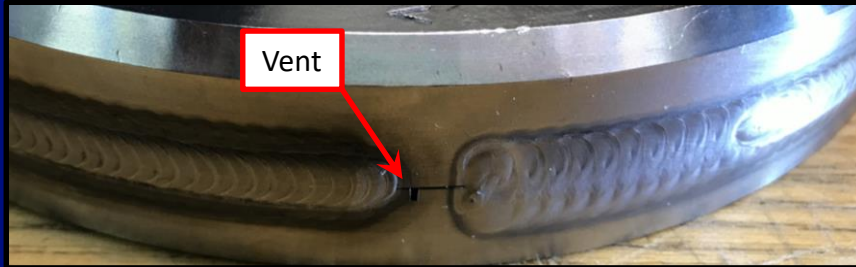
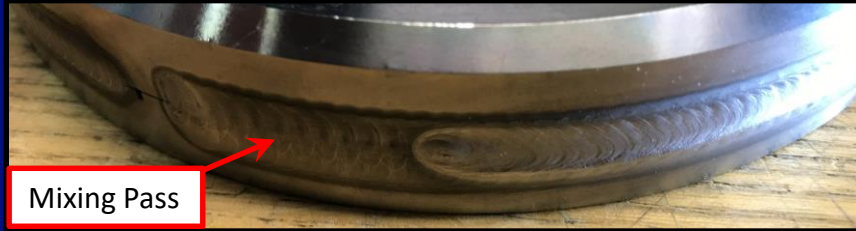
Overhead



Under bead



The Solution: The Mixing Pass & Penetration Pass



The Mixing, Penetration, & Optional Cover Passes

